Teacher Development Workshop

MATHEMATICAL LITERACY GRADE 11
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<thead>
<tr>
<th>Term</th>
<th>No of Weeks</th>
<th>Content Standard</th>
<th>Topic</th>
<th>Topic Number</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Term 1</strong></td>
<td>3</td>
<td>Patterns</td>
<td>Patterns, relationships and representations</td>
<td>1</td>
<td>1. Graphs that tell a story 2. Patterns and relationships 3. Tables, equations and graphs Revision</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Measurement</td>
<td>Measurement: Conversions and time</td>
<td>2</td>
<td>1. Conversions 2. Time Unit Revision</td>
</tr>
<tr>
<td><strong>Term 2</strong></td>
<td>4</td>
<td>Finance</td>
<td>Finance: Length, weight, volume (capacity) and temperature</td>
<td>4</td>
<td>1. Interest 2. Banking, loans and investments 3. Inflation Revision</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Maps, plans and other representation of the physical world</td>
<td>Scale and Maps</td>
<td>6</td>
<td>1. Scale 2. Maps Revision</td>
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<tr>
<td></td>
<td>1</td>
<td>Revision</td>
<td>Exam Practice Papers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td>Mid-Year Examinations</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>3</td>
<td>Maps, plans and other representation of the physical world</td>
<td>Plans and models</td>
<td>8</td>
<td>1. Plans 2. Models Revision</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Finance</td>
<td>Finance: Taxation</td>
<td>9</td>
<td>Taxation Revision</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Finance</td>
<td></td>
<td>11</td>
<td>Exchange rates Revision</td>
</tr>
<tr>
<td><strong>Term 4</strong></td>
<td>4</td>
<td>Data Handling</td>
<td></td>
<td>12</td>
<td>1. Develop questions and collecting data 2. Classify and organise data 3. Summarise data 4. Represent data 5. Interpret and analyse data Revision</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td></td>
<td>Revision</td>
<td>Practice Exam Papers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td></td>
<td>November Examinations</td>
<td></td>
<td></td>
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</table>
PROGRAMME OF ASSESSMENT FOR GRADE 11

CAPS provides every subject with a detailed Programme of Assessment. The table below indicates the formal assessment task for the year for Grade 11 Mathematical Literacy.

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Term 1</td>
<td></td>
</tr>
<tr>
<td>Assignment/Investigation</td>
<td>10%</td>
</tr>
<tr>
<td>Control test</td>
<td>15%</td>
</tr>
<tr>
<td>Term 2</td>
<td></td>
</tr>
<tr>
<td>Assignment/Investigation</td>
<td>10%</td>
</tr>
<tr>
<td>Midyear exam</td>
<td>30%</td>
</tr>
<tr>
<td>Term 3</td>
<td></td>
</tr>
<tr>
<td>Assignment/Investigation</td>
<td>50</td>
</tr>
<tr>
<td>Control test</td>
<td>15%</td>
</tr>
<tr>
<td>Term 4</td>
<td></td>
</tr>
<tr>
<td>Assignment/Investigation</td>
<td>10%</td>
</tr>
<tr>
<td>Year mark</td>
<td>25%</td>
</tr>
<tr>
<td>Term 4</td>
<td></td>
</tr>
<tr>
<td>Final exam</td>
<td>75%</td>
</tr>
<tr>
<td>Total Marks</td>
<td>100%</td>
</tr>
</tbody>
</table>

EXAM REQUIREMENTS FOR GRADE 11

The information below provides a summary of the exam requirements for June and end-of-year examinations for Grade 11 Mathematical Literacy.

<table>
<thead>
<tr>
<th>Grade 11 Exams</th>
<th>Time</th>
<th>Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid Year Exam (Papers 1 &amp; 2)</td>
<td>1.5 hours &amp; 1.5 hours</td>
<td>75 &amp; 75</td>
</tr>
<tr>
<td>Final (Papers 1 &amp; 2)</td>
<td>2 hours &amp; 2 hours</td>
<td>100 &amp; 100</td>
</tr>
</tbody>
</table>

**Discussion:**
Discuss the time allocated to the topics and assessment for Grade 11 Mathematical Literacy. What are the main time constraints going to be?
TEACHING MATHEMATICAL LITERACY GRADE 11

Activity A: Finance: Documents, systems, statements and budgets

This activity is taken from a Grade 11 Mathematical Literacy Topic. This example is given from Platinum Mathematical Literacy Grade 11.

Topics to be covered:
- Grade 11 Documents, Systems, Statements and Budgets
- Learning styles

Instructions:
- Participants should complete this activity in pairs.
- Study the diagram taken from Platinum Mathematical Literacy Grade 11.
- Answer the questions that follow.

![Diagram]

Taken from Platinum Mathematical Literacy Grade 11 (page 42)

Questions:
1. Why is it important to use graphics such as this one when teaching Mathematical Literacy?

2. Discuss creative methods, which teachers can use to ensure that learners understand the different terminology. For example the difference between credit and total liability.
**Activity B: Finance: Documents, systems, statements and budgets**

This activity is taken from a Grade 11 Mathematical Literacy Topic. This example is given from Platinum Mathematical Literacy Grade 11.

**Topics to be covered:**
- Grade 11 Documents, systems, statements and budgets
- Importance of understanding the information for future application

**Instructions:**
- Participants should complete this activity in pairs.
- Study the extracts taken from Platinum Mathematical Literacy Grade 11.
- Answer the questions that follow.

### Telephone (landline) invoices

Despite the popularity of cellphones, most households still have landlines and ADSL lines to connect to the internet.

**EXERCISE 2**

Study the telephone invoice for the Adonis household. Households are invoiced for calls made for a specific billing period. In other words, the customer pays for calls after they have been made.

<table>
<thead>
<tr>
<th>M-Tel tax invoice for Mrs P Adonis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mrs P Adonis</td>
</tr>
<tr>
<td>34 Oxford Road</td>
</tr>
<tr>
<td>Potchefstroom</td>
</tr>
<tr>
<td>4578</td>
</tr>
<tr>
<td>Account no. 8802336929</td>
</tr>
<tr>
<td>Invoice date: 9 Jan 2011</td>
</tr>
<tr>
<td>Due date: 1 Feb 2011</td>
</tr>
</tbody>
</table>

**Summary of your account**

<table>
<thead>
<tr>
<th>Payment invoice</th>
<th>Balance brought forward</th>
<th>R298.64</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payment(s)</td>
<td>Thank you</td>
<td>R298.60</td>
</tr>
<tr>
<td>Opening Balance</td>
<td></td>
<td>R0.04</td>
</tr>
<tr>
<td>This invoice</td>
<td></td>
<td>R307.09</td>
</tr>
</tbody>
</table>

**Latest account details**

<table>
<thead>
<tr>
<th>Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>This invoice (Nov 2010)</td>
<td>R116.93</td>
</tr>
<tr>
<td>Rental</td>
<td>R152.45</td>
</tr>
<tr>
<td>Usage</td>
<td>R269.38</td>
</tr>
<tr>
<td>Subtotal</td>
<td>R37.37</td>
</tr>
<tr>
<td>VAT</td>
<td>R0.00</td>
</tr>
<tr>
<td>Interest</td>
<td></td>
</tr>
<tr>
<td>Total (this invoice)</td>
<td>R307.09</td>
</tr>
</tbody>
</table>

**Payment remittance advice**

- Please pay as follows:
  - Previous invoice (4c is included in this invoice) R0.04
  - Amount now payable (due date 1 February 2011) R307.13
  - Coins discontinued (carried forward to next invoice) R0.03
  - Amount due R307.10

1. Identify and write down the account number and telephone number for the Adonis household.
2. What does the rental of the line cost per month?
3. What do the Adonis's have to pay in usage? Explain what 'usage' means.
4. Did the Adonis's settle their previous account? Give a reason for your answer.
5. How much must the Adonis's pay this month, and what is the due date for this payment?
6. Study the 'Payment remittance advice'. Explain why the 'Amount now payable' and the 'Amount due' differ by one cent.

Taken from Platinum Mathematical Literacy Grade 11 (page 43)
**Water and sewage tariffs**

Charges for water usage and sewage disposal are calculated according to a tiered system of tariffs, which vary for domestic or business use. It is important to note that these tariffs do not include VAT, which is added on afterwards. The tables below are typical examples of the tiered systems for domestic use. Note that both systems allow for free kilolitres.

<table>
<thead>
<tr>
<th>WATER</th>
<th>SEWAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Domestic 1: Tariffs</strong></td>
<td><strong>Disposal Charges:</strong></td>
</tr>
<tr>
<td>Volume</td>
<td>Tariff (per kl)</td>
</tr>
<tr>
<td>≤ 6 kl</td>
<td>Free</td>
</tr>
<tr>
<td>6,1–15 kl</td>
<td>R8,60</td>
</tr>
<tr>
<td>15,1–25 kl</td>
<td>R9,60</td>
</tr>
<tr>
<td>&gt; 25 kl</td>
<td>R10,60</td>
</tr>
</tbody>
</table>

**WORKED EXAMPLE**

The Von Trap household used 27 kl of water last month, and were charged R68 without VAT for sewage disposal.

1. Calculate the cost for using 27 kl of water, and then add VAT onto the bill.
2. Work out how many kilolitres of sewage were disposed of last month for this household.

**SOLUTION**

1. This water tariff allows for: 6 free kilolitres, 9 kl @ R8,60, 10 kl @ R9,60 and 2 kl @ R10,60.
   - 6 @ R0,00 = R0,00
   - 9 @ R8,60 = R77,40
   - 10 @ R9,60 = R96,00
   - 2 @ R10,60 = R21,20
   In total, 27 kl cost R194,60
   Total with 14% VAT: R194,60 + R27,24 = R221,84

2. This tariff allows for: 4 free kilolitres, 3 kl @ R4,67 and 8 kl @ R9,94.
   The disposal of 7 kl of sewage would cost: 4 @ R0,00 + 3 @ R4,67 = R14,01
   The disposal of 15 kl of sewage would cost: 4 @ R0,00 + 3 @ R4,67 + 8 @ R9,94 = R93,53
   This bill came to R68, which means that the volume of sewage lies between 7 and 15 kl.
   R68 – R14,01 = R53,99 is charged for sewage in the 7,1 to 15 kl bracket.
   Therefore, the average monthly kl of sewage in this bracket = R53,99 per kl ÷ R9,94 = 5,43 kl
   Therefore, the total kl of sewage disposed of last month = 4 kl + 3 kl + 5,43 kl = 12,43 kl.

Taken from Platinum Mathematical Literacy Grade 11 (page 48)
Questions:

The extracts above are examples of various ways in which the Platinum Mathematical Literacy Book encourages learners to understand concepts.

1. Discuss the difference between knowing and understanding and the impact of this on learner performance. How are you able to see whether the learner just knows the facts or truly understands the concepts?

2. How would you teach this section of work to ensure that the learners understand it?
Activity C: Patterns, Relationships and Representation

This activity is taken from a Grade 11 Mathematical Literacy Topic. This example is given from Platinum Mathematical Literacy Grade 11.

Topics to be covered:
- Grade 11 Patterns, relationships and representation
- Practical revision examples
- Interpreting Graphs

Instructions:
- Participants should complete this activity in pairs.
- Study the extracts taken from Platinum Mathematical Literacy Grade 11.
- Answer the questions that follow.

Interpreting graphs found in the media
Online and print media uses graphs in a variety of formats to explain, clarify or summarise a message or story, without using any mathematical terminology. Sometimes these graphs can stand completely on their own, while others rely on text to clarify exactly what they are summarising.
Study the graphs in the worked example to refresh your memory of some of the key concepts and terminology used to interpret the stories being told.

SOUTH AFRICA’S ECONOMIC SITUATION
The global financial crisis of 2008 and 2009 hit the South African economy hard, but things are looking up again, except in terms of unemployment.

WORKED EXAMPLE
Study the media graphs above.
Use descriptive key words like increasing, decreasing, rate, maximum and minimum, to describe the ‘stories’ summarised in the line graphs.

Taken from Platinum Mathematical Literacy Grade 11 (page 6)
WORKED EXAMPLE

Mandla sells second-hand CDs at a local flea market. To encourage people to buy the CDs, he decides on a policy of ‘the more you buy, the less you pay per CD’. The graph below represents his price structure.

1. Identify the dependent and the independent variables in this relationship.
2. Use the information described by the graph to complete the table values representing Mandla’s pricing structure.
3. A customer buys two CDs. How much must she pay in total?
4. A second customer spends R100. How many CDs did he buy?
5. A third customer pays R60. Is it possible to calculate the number of CDs he bought? Does this situation make economic sense?

<table>
<thead>
<tr>
<th>Number of second-hand CDs bought</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price in rands</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total value of prospective sale (in rands)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. Calculate how much Mandla would receive in rands from each prospective sale. Use this information to complete the table above.
8. Use this information to plot a second graph on the same set of axes.
9. What does the second graph represent? Suggest a change to Mandla’s pricing structure that will improve the way he does business.

SOLUTION

1. The number of CDs bought per customer is the independent variable. The price charged per CD is dependent upon the number of CDs bought, therefore this is the dependent variable.
2. See the table below.
3. R50
4. 10 CDs

Taken from Platinum Mathematical Literacy Grade 11 (page 22)
Understanding and interpreting points of intersection

WORKED EXAMPLE

4×4 vehicles are designed to allow access to remote or inaccessible places. This type of vehicle uses a unique system that allows each wheel to operate independently, thereby allowing the driver to drive through mud, water, soft sand and over uneven terrain. Traditionally, 4×4 vehicles were owned by farmers, game rangers and people who lived in remote places where roads were few and far between. Their sales were low in comparison to saloon cars.

‘Soft’ 4×4s and sport utility vehicles (SUVs) were cleverly marketed as ‘adventure vehicles’ which resulted in increased sales. Today, 4×4s and SUVs are popular choices for many city folk.

![Comparison of sales: Saloon cars vs 4×4s/SUVs](image)

The graph summarises an article in a motoring magazine, which reports on the growth of 4×4 and SUV sales.

1. Approximately how much revenue did saloon cars and SUVs/4×4s each earn in 2003?
2. a. At what point in time was the revenue earned on both saloon cars and SUVs/4×4s equal?
   b. How much revenue was earned by each type of vehicle at this point in time.
3. Study the graph and summarise its story.

SOLUTION

1. Saloon cars: R10 million
   SUVs/4×4s: R3,5 million
2. a. The revenue earned by both types of vehicles was equal in 2007.
3. The revenue from saloon cars is growing linearly. In contrast, the growth in revenue from SUVs/4×4s is exponential. The revenue from the sales of SUVs and 4×4s equalled and then surpassed that of the saloon cars in 2007.

Questions:

1. Discuss the importance of graphs in Mathematical Literacy.

2. Why do learners generally struggle to interpret graphs?
Activity D: Finance

This activity is taken from a Grade 11 Mathematical Literacy Topic. This example is given from Platinum Mathematical Literacy Grade 11.

Topics to be covered:
- Grade 11 Finance
- Levels of Questioning

Instructions:
- Participants should complete this activity in Pairs.
- Study the extracts taken from Platinum Mathematical Literacy Grade 11
- Answer the questions that follow

### EXERCISE 13

1. Classify the household expenses given below under the following headings:
   - a  Fixed expenses
   - b  Variable expenses
   - c  Irregular expenses
   - d  Emergency expenses

   Insurance, clothing, electricity and water, school fees, home loan repayment, holiday, car repayment, furniture repayment, fuel, car service, geyser repair, telephone account, doctors bill, locksmith’s bill (for lost keys), repainting the kitchen, DSTV installation, savings, income tax, entertainment, new lawnmower, birthday gifts.

2. Joanne earns R12 500 per month. Her car repayment comes to R1 299 per month, medical aid to R890 and rent to R3 500 per month. She saves R500 every month. Her average weekly grocery bill is R900 and her fuel bill is R750.
   - a  Set up a budget for Joanne, using all of these items.
   - b  Joanne did not budget for emergency expenses. Is this wise? Give a reason for your answer.
   - c  Critically evaluate Joanne’s budget and make suggestions for improvements, wherever you think is necessary.

Taken from Platinum Mathematical Literacy Grade 11 (page 55)
Questions:

1. What cognitive level of thinking would you place the above two questions on? Discuss your reasons for this.

<table>
<thead>
<tr>
<th>Order</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>High Order</td>
<td>Requires learners to think creatively and apply logic and problem solving. They are often inquiry or synthesis or skill based.</td>
</tr>
<tr>
<td>Middle order</td>
<td>Requires learners to apply knowledge, analyse and interpret information and demonstrate understanding through examples and explanations.</td>
</tr>
<tr>
<td>Lower Order</td>
<td>Requires basic knowledge and recall. Learners need to master this level in order to attempt middle order questions.</td>
</tr>
</tbody>
</table>
At the beginning of the workshop, you were required to rank the importance of the criteria that are considered important to most teachers when choosing a textbook.

Platinum Mathematical Literacy covers all of these criteria.

**Sequencing of Content according to the CAPS**

Platinum Mathematical Literacy books follow the exact sequence of the CAPS. Teachers are able to follow the sequence of the textbook and be confident that they have covered everything required by CAPS and in the correct order.

**Relevant and up to date content**

The authors of Platinum Mathematical Literacy have ensured that the latest CAPS requirements are covered as well as the latest content required by the subject. Assessment tasks are all relevant to the age group and environments of the learners.

**Specific tasks required for Programme of Assessment e.g. Tests, Projects etc.**

Platinum Mathematical Literacy books include all the required tasks for the Programme of Assessment and the Teacher’s Guide includes step-by-step teaching and full solutions. Tasks can also be used for revision, extension and expanded opportunities.

**Annual teaching plan according to the CAPS with term-by-term overview**

Platinum Mathematical Literacy books follow the exact sequence of the CAPS. They also provide a detailed work schedule, which assists in annual and term planning.

**Teacher’s Guide, which provides guidance and answers for Programme of Assessment**

Platinum Mathematical Literacy books have a Teacher’s Guide that provides guidelines on how to use the assessments and how to mark them. Rubrics, memoranda and checklists are also provided where appropriate.

**Variety of revision activities**

Platinum Mathematical Literacy books provide many different activities, which test knowledge and understanding on a variety of levels. Teachers are able to see the learners’ understanding of the content matter straight away. These activities are very practical and assess the content in the CAPS.
Diagrams and pictures to explain content

Platinum Mathematical Literacy books provide many supporting diagrams and pictures to support the content and are full colour.

Remedial activities to support those learners that may need extra support

Platinum Mathematical Literacy books have many activities in the units as well as revision sections at the end of every topic. Platinum Mathematical Literacy provides Target Worksheets, which provide support for full differentiation including remedial activities. These can be photocopied and can be found at the back of the Teacher’s Guide.

Extension activities to support those learners that need expanded opportunities

Platinum Mathematical Literacy has many activities in the chapters as well as revision sections at the end of every topic. Platinum Mathematical Literacy provides Target Worksheets, which provide support for full differentiation including extension activities. These can be photocopied and can be found at the back of the Teacher’s Guide.

Platinum Mathematical Literacy components:

| • Learner’s Book
| • Teacher’s Guide with Control Test Book and Question Bank CD |